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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,139	05/29/2001	Fumiaki Maruyama	107242-00017	3293

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EXAMINER

MAI, ANH D

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/856,139	MARUYAMA ET AL.	
	Examiner	Art Unit	
	Anh D. Mai	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-77 is/are pending in the application.
- 4a) Of the above claim(s) 27-66 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 67-77 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>7/25/01</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group V, claims 67-77 in Paper filed October 16, 2003 is acknowledged. Claims 27-66 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Drawings

2. Figures 10 and 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 68 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

The limitation of claim 68: "having a boron-less filter and boron absorbing filter" have been claimed in claim 67.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 67-69 are rejected under 35 U.S.C. 102(e) as being anticipated by Kobayashi et al. (U.S. Patent No. 5,997,598).

Kobayashi teaches a clean room air conditioning facilities as claimed including:

an air conditioner having a boron-less filter and a boron adsorbing filter (ULPA filter), and one or more of wafer treatment apparatuses (local facilities) each having a boron-less filter (ULPA filter), wherein an atmosphere gas is recycled (return air) between the air conditioner, the clean room and the wafer treatment apparatuses. (See Example 3).

With respect to claim 68, as best understood by the examiner, the clean room of Kobayashi has a boron-less filter and a boron adsorbing filter (ULPA filter).

With respect to claim 69, an Official Notice is taken regarding the internal pressure of a wafer treatment apparatus (local facilities) is adjusted to be higher than a clean room internal

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pressure and the clean room internal pressure is be higher than a clean adjusted to be higher than an external pressure (outside). These are known as positive pressure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '598 as applied to claim 67 above, and further in view of Applicant admitted prior art (hereafter admitted art).

Kobayashi teaches fabricating semiconductor wafer utilizing a clean room air conditioning facilities.

Thus, Kobayashi is shown to teach all the features of the claim with the exception of explicitly disclosing the amount of boron attaches on the surface of the wafer.

However, Admitted art teaches fabricating semiconductor device on a semiconductor wafer having attaches boron amount on the surface of the silicon wafer of 1×10^{10} atoms/cm². (See page 2, ll. 10-17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi in the fabricating a semiconductor device on the wafer as taught by the Admitted art because the clean room of Kobayashi would have avoid unnecessary doping of the wafer by eliminating dopant in the ambient.

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6. Claims 71-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '598 as applied to claim 67 above, and further in view of Mitani et al. (U.S. Patent No. 5,804,494) (hereafter Mitani) and Applicant admitted prior art.

With respect to claims 71-73, Kobayashi teaches fabricating semiconductor wafer utilizing a clean room air conditioning facilities.

Thus, Kobayashi is shown to teach all the features of the claim with the exception of explicitly disclosing the wafer having boron concentration in the bulk silicon and a surface layer formed on the bulk silicon.

However, Admitted art teaches fabricating semiconductor device including forming a surface layer (62) on a bulk silicon wafer (W). (See Fig. 10, page 2, ll. 10-17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi to form the surface layer on the bulk silicon wafer in the fabricating a semiconductor device as taught by the Admitted art because the clean room of Kobayashi would have avoid unnecessary addition of boron on the wafer surface by eliminating boron in the ambient.

Further, Mitani teaches a conventional silicon wafer having boron concentration in the range of 10^{15} atoms/cm³. (See third embodiment, Fig. 7).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi in forming the semiconductor device on the wafer as taught by Mitani since boron have been eliminated form the ambient in the clean room, thus, boron contamination of the wafer surface is avoided.

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With respect to the increment of boron concentration in the surface layer down to the depth of 0.5 μ m, since the wafer (W) of the admitted art has been subjected to a thermal treatment following the formation of the surface layer (62), thus, boron from the surface of wafer (W) is known to diffuse toward the bulk silicon, thus, result in increment of boron concentration. (See page 2, ll. 10-16).


With respect to claims 74-77, a similar reasoning as that of claims 71-73 above is also applied here. Further, the silicon wafer (W) of the admitted art also includes a CVD silicon oxide film (64) provided on the polysilicon layer (62). (See Fig. 10c).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (703) 305-0575. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


A.M
December 31, 2003

